SCIENTIFIC PAPER JSLS

A 5-mm Open-entry Technique Achieves Safe, Single-step, Cosmetic Laparoscopic Entry

Martin D. Keltz, MD, Jennifer Lang, MD, Inna Berin, MD

ABSTRACT

Background and Objective: The rare but serious complications of blind Veress needle insertion during laparoscopy include bowel and vascular injury. To reduce these risks, a novel method of open laparoscopy was introduced into our clinical practice, and its efficacy was evaluated.

Methods: This is a retrospective evaluation of a novel 5-mm-open laparoscopic technique in a university hospital-based endoscopy practice in 65 consecutive patients undergoing laparoscopy with a single surgeon.

Result: A 71% success rate was achieved using the 5-mm open-entry laparoscopic technique. No complications occurred during any of the laparoscopic procedures, but 29% reverted to a standard 5-mm Veress needle technique. The success of the open-entry technique was independent of prior abdominal surgery, subject age, or body mass index (BMI).

Conclusion: The 5-mm open-entry technique is safe, fast, and cosmetic. It is easily mastered and may be converted to a standard Veress needle technique if peritoneal entry is not achieved.

Key Words: Laparoscopic open entry, Trocar, Veress needle.

INTRODUCTION

As laparoscopy in gynecologic surgery becomes more widely utilized, gynecologists continue to seek safer and more cosmetically acceptable techniques. Approximately 50% of all complications during laparoscopy occur during the creation of a pneumoperitoneum.[1] This step generally involves the blind insertion of a Veress needle, followed by the blind insertion of a sharp trocar into the peritoneal cavity. Bowel and vascular injuries are rare but serious complications of this initial step in laparoscopy.[2,3] Insufflation of the subcutaneous or preperitoneal space may also occur using this blind technique, the former creating subcutaneous emphysema, the latter complicating visibility during the subsequent procedure.[4] Overall, combined incidences of Veress needle- or trocar-related injury have been quoted at 2.7 to 2.9/1000.[5] In an attempt to avoid complications with the Veress needle, direct trocar insertion before attaining pneumoperitoneum has also been advocated. Although it is possible to confirm intraabdominal placement of the trocar with the laparoscope before insufflation with carbon dioxide gas, the risk of vascular and bowel injuries still exists with potentially wider, more serious injuries.[2]

In light of these problems, open laparoscopic techniques have been developed, such as the Hasson approach, first described in 1971.[6] This involves a periumbilical laparotomy of at least 2 cm, dissecting down to the linea alba under direct visualization and suturing this fascial layer, exposing the peritoneum. This has been the approach favored by general surgeons, and often used by gynecologists operating on patients with previous laparotomies, suspected adhesions, or cancer. Perhaps secondary to selection bias, when gynecologists have retrospectively compared complication rates between closed and open-entry techniques, the open techniques were associated with higher entry-related complications.[7]

Laparoscopic surgery offers shortened recovery time and improved cosmesis for a variety of pelvic surgeries yet involves the potential for risk during the initial blind trocar insertion. Prior to initiating this study, the author noted that intraumbilical skin incisions, if stretched, frequently lead to a small, visualized peritoneal opening in thin women. We decided to study whether an intentional tech-

Division of Reproductive Endocrinology, Department of Obstetrics and Gynecology, St. Luke's-Roosevelt Hospital Center, Columbia University College of Physicians and Surgeons, New York, New York, USA (all authors).

Special thanks to Jill K. Gregory, Medical Illustrator.

Address reprint requests to: Martin D. Keltz, MD, Director, Division of Reproductive Endocrinology, Department of OB/GYN, St. Luke's–Roosevelt Hospital Center, 1000 10th Ave, New York, NY 10019, USA. Fax: 212 523 8348, E-mail: MDKeltz@aol.com

nique of 5-mm open entry could be applied to all our laparoscopic cases.

METHODS

The same attending surgeon performed 65 consecutive diagnostic and/or operative laparoscopies through the 2-month rotations of 3 residents in 2004 through 2005 at St. Luke's-Roosevelt Hospital Center. The open-entry technique was attempted in all cases. If peritoneal entry was not attained, a standard technique using a Veress needle was performed. Approval for the study was obtained from the institutional review board at our institution.

Open-entry Technique

The umbilicus just superior to the inferior margin of the umbilical fold is grasped with a tonsil clamp and elevated. The assistant then injects 1 mL of a 0.25% bupivacaine local anesthesia into the umbilicus superior to the clamp. A number 11-blade scalpel is then used to incise the skin 2 mm to 4 mm in a vertical direction within the umbilicus superior to the elevated tonsil clamp. A second tonsil clamp is then used with a downward spreading motion to bluntly dissect the subcutaneous tissue until the fascial plane is reached. Further downward stretching with the tip of the tonsil clamp will generally separate the fascia and peritoneum, permitting visualization of the peritoneal cavity. A 5-mm Endopath bladeless trocar (Ethicon Endo-Surgery Inc, Cincinatti, OH) is then gently inserted, requiring minimal downward pressure at a safe angle, into the peritoneal cavity under direct visualization with a 5-mm laparoscope **(Figures 1 and 2)**. Pneumoperitoneum is then achieved with carbon dioxide gas. Upon completion of the laparoscopic procedure, this 5-mm mid umbilical incision is closed with an absorbable subcuticular suture.

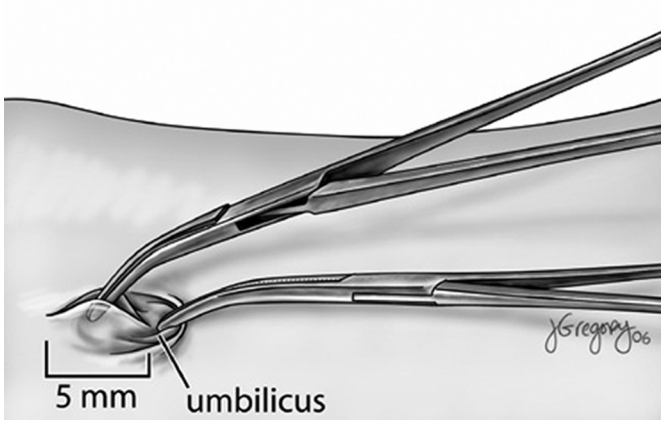

Figure 1. Downward stretching of the umbilical incision with tonsil clamp.

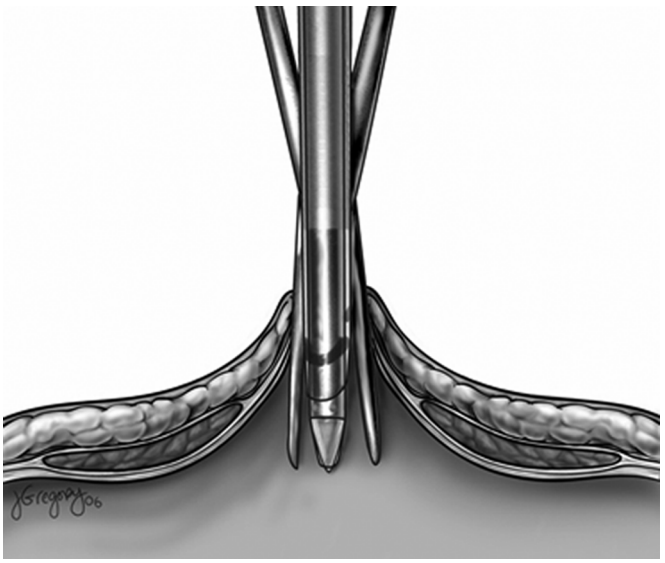

Figure 2. Insertion of bladeless trocar under direct visualization.

RESULTS

In 46 of 65 patients (70.8%), the Endopath bladeless trocar could be placed directly into the peritoneal cavity (successful open entry). There were no differences in age, body mass index (BMI), or history of prior surgery between patients with a successful open entry (Group A) and those requiring blind Veress insertion (Group B) **(Table 1)**.

DISCUSSION

Because the overall rate of entry-related injuries during laparoscopy remains relatively low, no study of significant

Table 1.
Characteristics of Patients With Successful and Failed 5-mm Open Entry

Characteristics	Group A n(%)	Group B n(%)
Number of patients	46 (70.8)	19 (29.2)
Mean age (years)	36.5	35.8
Body mass index (BMI)	23.0	24.1
Prior abdominal surgery		
Yes	18 (391)	8 (42.1)
No	28 (60.9)	11 (57.9)

size exists that clearly demonstrates the superiority of one entry technique over another. The 5-mm open-entry technique as described above is advantageous because it combines entry under direct visualization with the benefits inherent to a smaller fascial defect, along with the cosmetic appeal of a small incision hidden within the umbilicus.

The technique was successful at obtaining open-entry placement of a 5-mm Endopath bladeless trocar in 71% of patients. If entry was not obtained via this technique, a Veress needle placement followed without difficulty through the same small umbilical incision.

CONCLUSION

Overall, the characteristics between the 2 groups were similar, suggesting that neither a higher BMI nor a history of prior abdominal surgery is a contraindication to attempting the 5-mm open-entry trocar placement. This technique was learned by successive residents during a brief rotation, suggesting the technique may be easily mastered.

References:

1. Harkki-Siren P, Kurki T. Nationwide analysis of laparoscopic complications. *Obstet Gynecol.* 1997;89:108–112.

2. Schafer M, Lauper M, Krahenbuhl L. Trocar and Veress needle injuries during laparoscopy. *Surg Endosc.* 2001;15:275–280.

3. Catarci M, Carlini M, Gentileschi P, Santoro E. Major and minor injuries during the creation of pneumoperitoneum. A multicenter study on 12,919 cases. *Surg Endosc.* 2001;15(6):566–569.

4. Ahn YW, Leach JA. A comparison of subcutaneous and preperitoneal emphysema arising from gynecologic laparoscopic procedures. *J Reprod Med.* 1976;17(6):335–337.

5. Rosen DMB, Lam AM, Chapman M, Carlton M, Cario GM. Methods of creating pneumoperitoneum: a review of techniques and complications. *Obstet Gynecol Surv.* 1998;53:167–174.

6. Hasson HM. A modified instrument and method for laparoscopy. *Am J Obstet Gynecol.* 1971;110:886–887.

7. Jansen FW, Kolkman W, Bakkum EA, De Kroon CD, Trimbos-Kemper TCM, Trimbos JB. Complications of laparoscopy: an inquiry about closed versus open-entry technique. *Am J Obstet Gynecol.* 2004;190:634–638.